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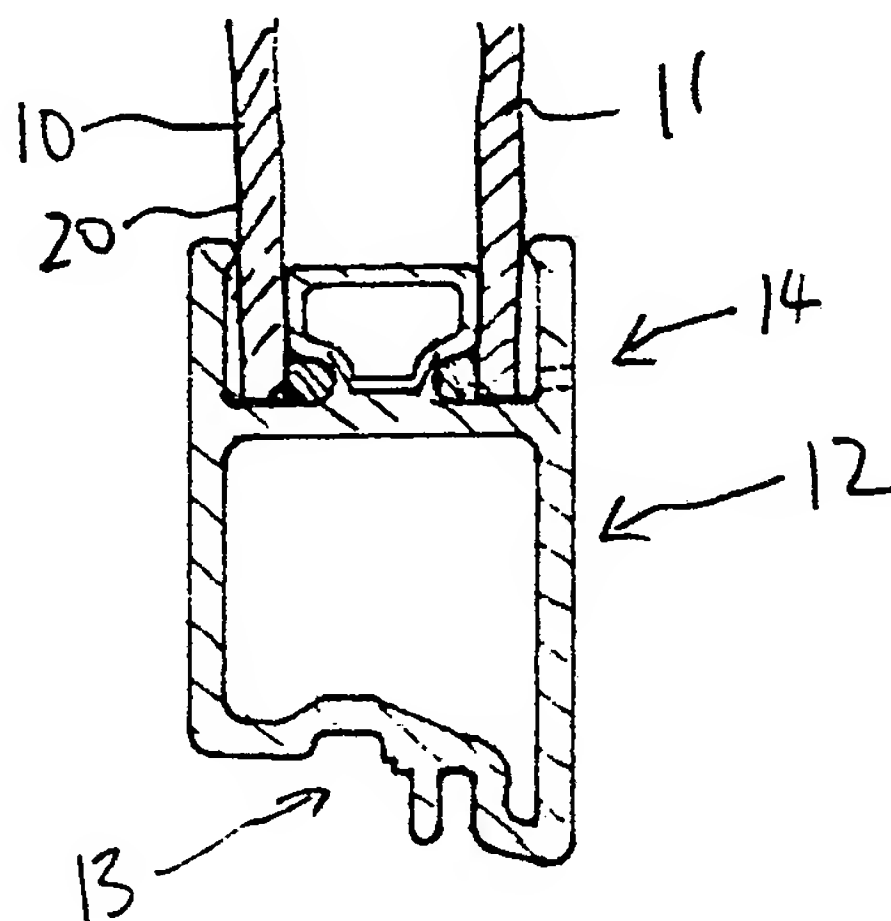
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(54) Title: SEALED WINDOW ARRANGEMENT



(57) Abstract

A sealed window arrangement comprises a profile (12) and two sheets of glass (10, 11). The profile defines a channel portion (14) with a web (15) against which an edge of the glass rests. The profile includes an integral spacer (21) contacting against inner surfaces of the glass sheet to hold them at the required spacing. The only sealant is positioned between the spacer and the glass to avoid exposure to the elements. The profile is formed by pultrusion from longitudinally extending reinforcement fibers so as to have a longitudinal coefficient of thermal expansion close to that of the glass.

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SEALED WINDOW ARRANGEMENT

This invention relates to a sash window arrangement and particularly to a construction of sash window, including frame profiles and at least two panes of glass formed into a sealed window unit, which has a simplified construction.

Conventionally a sealed window unit comprises at least two panes of glass which are separated by a spacer including a desiccant material. The spacer is suitably sealed to the inner faces of the glass sheets and then the outer edge of the window unit is completed by a tape or similar material. In this way penetration of moisture or air into the space between the glass sheets is prevented. The window unit so formed is then seated into four separate lengths of frame profile which are connected into a rectangular frame surrounding the window unit. In many cases the profile includes a channel with a transverse web contacting the outer edge of the window unit and a pair of upstanding sides which confine the window unit.

Between the profile and the window unit it is necessary to provide a suitable bedding or sealing material so that the window unit is generally relatively loose fit within the profile and the space between the

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window unit and the profile is filled by rubber gaskets or other sealing material which is provided on the inner surface of the sides of the profile and generally projects upwardly beyond the top of the sides onto the face of the glass. In some cases this is provided by a separate gasket. In other cases it is provided by a bead of a sealant material. In all cases it is considered necessary to prevent the entry of air or moisture between the top edge of the side and the outer face of the glass sheet. This leaves an outer portion of the sealant material which is exposed to the environment and accordingly can crack and deteriorate.

The manufacture of the complete sash is relatively complicated including assembly of the various different parts thus leading to relatively high labor costs.

It is one object of the present invention to provide an improved sash window arrangement which has sealing material between the sealed window unit and the window frame profile which is of a simplified construction and accordingly cheaper to manufacture.

It is a further object of the present invention to provide an improved sash window unit in which the sealing material between the window unit and the sur-

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rounding profile is received wholly inside the channel and accordingly is not exposed to environmental deterioration.

According to the invention, therefore, it is provided a sash window comprising window frame profile and at least two sheets of glass mounted in the profile to form a sealed window unit, characterized in that the profile is shaped to define as an integral construction a channel portion having a web against which edges of the glass sheets contact, a pair of upstanding sides confining outer surfaces of the sheets and a spacer element upstanding from the web between the sheets confining inner surfaces of the sheets.

One embodiment of the invention will now be described in conjunction with the accompanying drawings in which:

Figure 1 is a cross-sectional view through a sash window unit showing sheets of glass and one profile confining and supporting the sheets of glass.

Figure 2 is a cross-sectional view on an increased scale of the profile of Figure 1 prior to mounting the sheets of glass in place.

The sash window unit comprises two sheets of glass 10 and 11 one of which indicated at 10 is intended

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for facing inwardly of the finished window and the other of which indicated 11 is intended to face exteriorally of the finished window. The window further comprises a frame defined by four lengths of a profile generally indicated at 12 with each of the lengths being arranged to enclose one side of the rectangular sheets of glass with suitable corner arrangements for connecting the four frame sides thus formed into a rectangular frame structure.

The outer portion of the profile generally indicated at 13 is of little importance in the present invention and thus will not be described in detail. The important portion of the profile in relation to the present invention relates to the inner portion thereof indicated at 14 which contacts and confines the glass sheets 10 and 11. The inner portion comprises a generally channel shaped section including a transverse web 15 and a pair of upstanding sides 16 and 17. Each of the sides includes an inner surface which is generally at right angles to the web as indicated at 18 and a slightly inwardly turned lip 19 which contacts and confines the outer surface 20 of the glass sheet.

Projecting upwardly from the web 15 at a position thereon between the sides 16 and 17 is provided

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an integral spacer 21. The spacer is manufactured integrally with the profile and comprises an upper surface 22, side surfaces 23 and 24 and a hollow interior 25 for receiving a desiccant material. The sides 23 and 24 of the spacer element are generally vertical that is directly parallel to the inner surfaces 18 of the sides 16 and 17. A lower portion of the sides 23 and 24 as indicated at 26 is inclined inwardly to define a concave area 27 generally underneath the spacer element and between the spacer element and the web 15. A lower surface of the spacer element is contiguous with the web in view of the integral formation of these two parts. The whole profile is formed by the technique of protrusion which is a known technique in which continuous longitudinal glass fibre material including roving and fibre mat are drawn through a bath of a thermosetting resin and passed through an elongate heated die which causes the resin to set thus forming the profile of a plastics material which is reinforced by the longitudinal glass fibres. In view of the fact that the fibres extend substantially continuously in the longitudinal direction, the coefficient of thermal-expansion of the part in the longitudinal direction is substantially equal to that of glass.

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The profile shown in Figures 1 and 2 is thus formed separately from the glass sheet as a continuous body and is cut to length to form the required frame sides for connection together. Two beads of a sealant material indicated at 28 and 29 are then inserted into the channel shape between the sides 16 and 17 and the spacer element 21. The beads are inserted as close as possible to the spacer element so that they lie underneath the side surfaces 23 and 24 and project as far as possible into the concave area 27. The beads of sealant material can be injected into place from a gun or can be formed as separate elements and inserted manually. The beads of the sealant material are formed of a structural sealant of the type which cures and provides a high level of adhesive action against any material contacting the sealant. Such a material can be urethane, polysulphide or silicone.

After the beads are inserted in place in a continuously longitudinally extending manner along the length of the profile, the plain glass sheets can be inserted into the area between the outer sides of the spacer element and the inner surface of the sides 16 and 17. When the glass is inserted, it compresses the respective one of the beads 28 and 29 forcing the sealing

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material more vigorously into the recess 27 and compressing some of the material against the web 15. A sealing action is thus obtained between the inner surfaces of the glass sheets 10 and 11 and the sides of the spacer element 21. Effectively no sealant material is provided between the outer surfaces of the glass sheets and the respective sides 16 and 17. Thus no sealant material is exposed at the top of the side 16 and 17 for environmental degradation.

A drain hole 30 is provided in the outer side 17 adjacent the connection thereof with the web 15 so as to allow any moisture penetrating between the side 17 and the outer surface of the glass sheet 11 to escape.

The window unit can thus be formed very simply using very little sealant material and significantly reduced amounts of labour in comparison with the conventional techniques of initially forming a sealed window unit and subsequently inserting the sealed window unit with the necessary sealing materials or gaskets into the frame profile.

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CLAIMS

(1) A window comprising a window frame profile and at least two sheets of glass mounted in the profile to form a sealed window unit, characterized in that the profile (12) is shaped to define as an integral construction a channel portion (14) having a web (15) against which edges of the glass sheets (10,11) contact, a pair of upstanding sides (16,17) confining outer surfaces of the sheets and a spacer element (21) upstanding from the web between the sheets (10,11) confining inner surfaces of the sheets.

(2) The invention according to Claim 1 including a sealant material (28,29) between the inner surfaces of the sheets and the spacer element (21).

(3) The invention according to Claim 2 in which the spacer element has on each side a side surface having a first portion (23,24) for contacting the inner surface of the respective glass sheet and a recess portion (27) beneath the contacting portion and between the contacting portion and the web, the sealant material (28,29) being inserted into the recess portion (27).

(4) The invention according to Claim 1 wherein the upstanding sides (16,17) directly contact the outer surface of the respective sheet so that there is no

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sealant therebetween exposed to environmental degradation.

(5) The invention according to Claim 4 including a drainage opening (30) in that one of the upstanding sides (17) for facing to the exterior of the window.

(6) The invention according to Claim 1 wherein the sealant (28,29) is selected from the group comprising urethane, polysulphide and silicone.

(7) The invention according to Claim 1 wherein the profile (12) is manufactured from material such that the coefficient of thermo-expansion of the profile in a longitudinal direction is substantially equal to that of glass.

(8) The invention according to Claim 7 wherein the clearance between the outer edge of the sealed window unit and the upper surface of the web is less than 0.060 inches.

(9) The invention according to Claim 8 wherein the profile is manufactured by pultrusion from a thermosetting material reinforced by longitudinally extending glass fibre.

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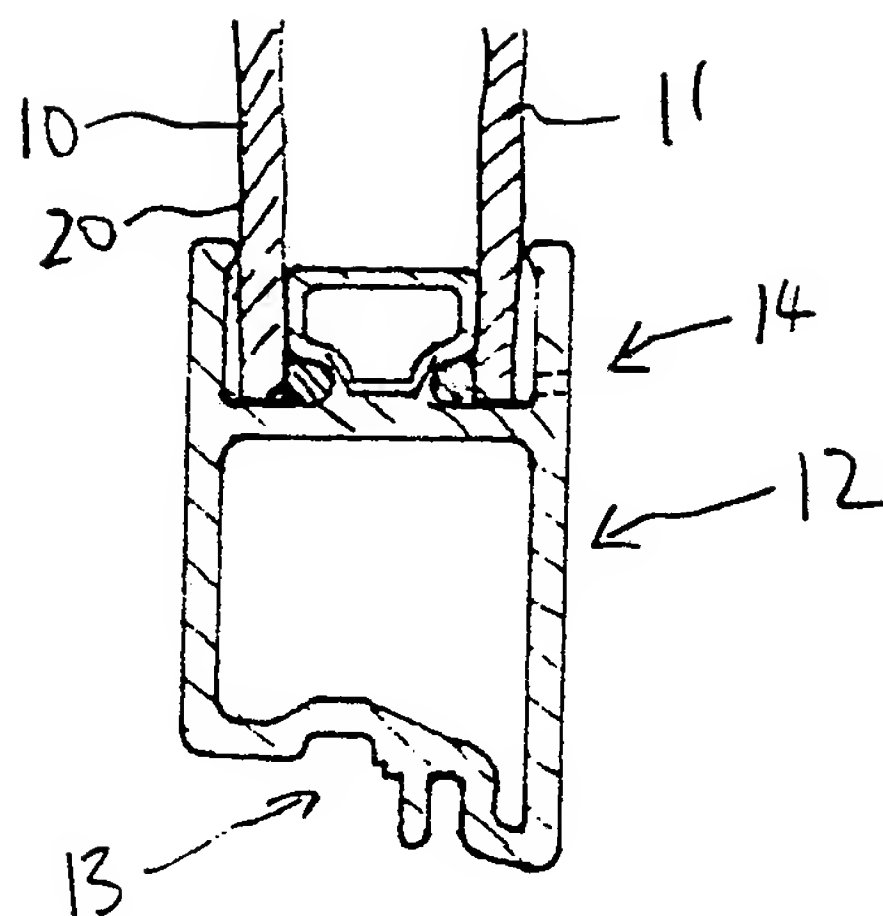


Fig. 1

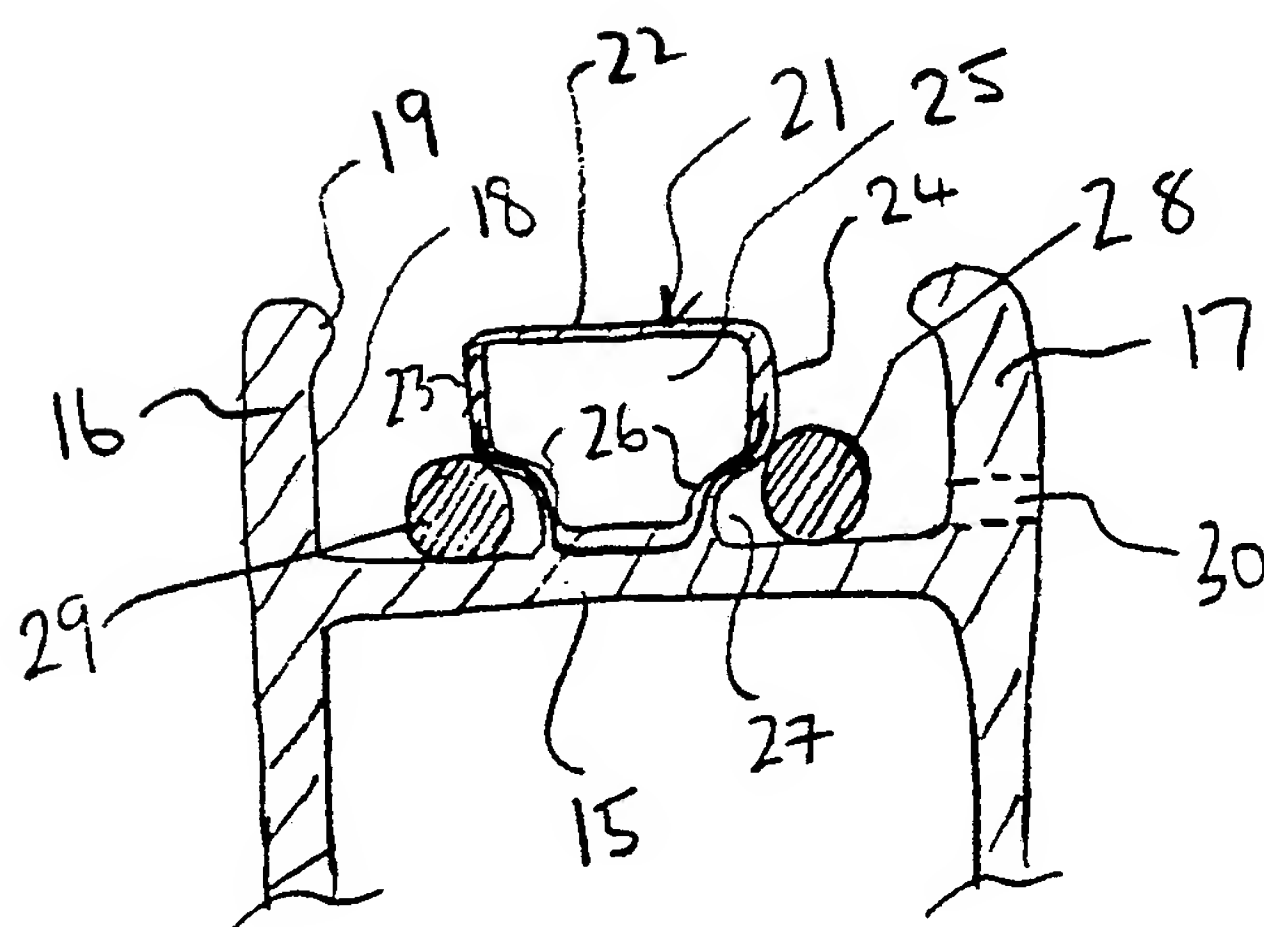


Fig. 2

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 90/00405

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl. 5 E06B3/24 ; E06B3/66		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	E06B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ^o	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	DE,A,2440781 (WILH. FRANK) 18 March 1976 see page 11, line 1 - page 18, line 17; figures 1, 2	1-3
Y A	---	7, 9 4
X	FR,A,2222523 (CAILLON) 18 October 1974 see page 2, line 32 - page 3, line 14; figure 2	1-4, 6
Y	---	5
X	GB,A,2150185 (BRITISH ALCAN ALUMINIUM) 26 June 1985 see page 1, line 92 - page 2, line 20; figure 1	1-3
A	---	4
X	FR,A,2445885 (BFG GLASGROUP) 01 August 1980 see page 7, line 16 - page 13, line 25; figures 1-15	1-3
A	---	4
-/--		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>^o Special categories of cited documents : ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
20 FEBRUARY 1991	12 MAR 1991	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	DEPOORTER F.	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
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Y	DE,A,3415679 (HERWEGH) 03 October 1985 see page 4, paragraph 3 - page 9, paragraph 3; figures 1-3 ---	5
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A	CA,A,901882 (GELINAS) 06 June 1972 ---	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

PCT/CA 96/00405
SA 41835

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
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20/02/91

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CA-A-901882	06-06-72	None	

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EUR-CL (EPC): E06B003/24 , E06B003/663

ABSTRACT:

A sealed window arrangement comprises a profile (12) and two sheets of glass (10, 11). The profile defines a channel portion (14) with a web (15) against which an edge of the glass rests. The profile includes an integral spacer (21)

contacting against inner surfaces of the glass sheet to hold them at the required spacing. The only sealant is positioned between the spacer and the glass to avoid exposure to the elements. The profile is formed by pultrusion from longitudinally extending reinforcement fibers so as to have a longitudinal coefficient of thermal expansion close to that of the glass.